

1 DEIRDRE DES JARDINS  
2 145 Beel Dr  
3 Santa Cruz, California 95060  
4 Telephone: (831) 423-6857  
5 Cell phone: (831) 566-6320  
6 Email: ddj@cah2oresearch.com

7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
Party to the WaterFix Hearing  
Principal, California Water Research

**BEFORE THE**  
**CALIFORNIA STATE WATER RESOURCES CONTROL BOARD**

HEARING IN THE MATTER OF  
CALIFORNIA DEPARTMENT OF  
WATER RESOURCES AND UNITED  
STATES BUREAU OF  
RECLAMATION  
REQUEST FOR A CHANGE IN POINT  
OF DIVERSION FOR CALIFORNIA  
WATER FIX

REBUTTAL TESTIMONY OF  
DEIRDRE DES JARDINS

1 I, Deirdre Des Jardins, do hereby declare:

2 I. EXPERIENCE AND QUALIFICATIONS

3 My name is Deirdre Des Jardins. I am the principal of California Water Research. I have  
4 performed independent research and analysis relating to California's developed water supply since 2010,  
5 including analyses for a wide range of environmental and fishing groups in California. I have a  
6 comprehensive background in computational modeling, physics, and applied mathematics, which allows  
7 me to read and synthesize information from a wide range of scientific literature, agency reports, and  
8 technical and environmental documents. I also analyze complex physical and operational systems and  
9 associated modeling, and produce analyses of hydrologic and other data as needed. My background in  
10 theoretical physics allows new insights into the complexities of California's state and federal water  
11 projects.  
12

13  
14 As a principal at California Water Research, I have also done research on the three major  
15 drivers of change to California's developed water supply and uses: climate change, soil and groundwater  
16 salinization, and population growth and associated growth in urban water use. My comments to the Delta  
17 Stewardship Council ("DSC"), the Department of Water Resources ("DWR"), and the State Water  
18 Resources Control Board ("Board") have regularly raised concerns about the risk of increased frequency  
19 and severity of droughts due to climate change prior to 2014.  
20

21 My scientific background involved the development and application of a wide range of different  
22 computational models of physical systems, as well as work with some of the leading research groups in  
23 the world in their fields. I did research and modeling at the Center for Nonlinear Studies at Los Alamos  
24 National Laboratory as well as the Advanced Computing Laboratory at the National Aeronautics and  
25 Space Administration's ("NASA's") Ames Research Center. The Center for Nonlinear Studies was  
26 preeminent in the world for research in nonlinear dynamics and Chaos theory at the time I did research  
27 there. I later did research with the Computational Mechanics Research Group at the Santa Fe Institute,  
28 which was the preeminent research center in the world in Complex Systems Theory. I also worked with

1 the Bioinformatics Research Group at the University of California, Santa Cruz, which was renowned for  
2 assembling the Human Genome sequence.

3 I received a bachelor's degree in applied mathematics from the University of California, Santa  
4 Cruz in 1992. I was a fellow with the National Physical Science Consortium for six years, and worked  
5 toward a doctorate in Computer Science at the University of California, Santa Cruz, with studies in  
6 Machine Learning, Bioinformatics, and Complex Systems Theory. My statement of qualifications is  
7 attached as Exhibit DDJ-100.<sup>1</sup>  
8

### 9 **Bureau of Reclamation Change Petition and Original Permits**

10

11 The Bureau of Reclamation is seeking to add three new points of Direct Diversion to Permits  
12 12721, 12722, and 12723, which total 18,000 cfs (SWRCB-12, SWRCB-13, and SWRCB-14.) The  
13 source for these permits is the Sacramento River and the Delta. As explained below, I believe the  
14 evidence shows that the Preferred Project / California WaterFix would create additional diversion  
15 capacity in exceedance of the permitted rates of direct diversion authorized under the existing permits.  
16 The Board should examine this evidence closely, and consider whether the petition is, in effect, a new  
17 water right.

18 Neither the Change Petition nor the Petitioners' Case in Chief provides clear information on  
19 the current and proposed total rates of direct diversion from the Sacramento River and the Delta under  
20 these permits. Thus the Board does not have sufficient information to even determine if the permitted  
21 rate of diversion will be exceeded with the 9,000 cfs of new diversions. The current and proposed  
22 diversion schedules are also required under Title 23 CCR § 794.

23 The Delta Cross Channel is listed in the above permits as having an intended capacity of  
24 9,500 cfs, and is included in the Bureau's permits of 18,000 cfs of direct diversion from the Sacramento  
25 River. In SWRCB-12, p. 177, Paragraph 6: INTAKE OR HEADWORKS, Application 5626 for permit  
26 12721 states:

27 Delta Cross Channel: It is intended to divert about 9,500 cfs of  
28

---

<sup>1</sup> Exhibit DDJ-100 is a true and correct copy of the document.

1 Sacramento River water into the delta channels of the San Joaquin River.  
2 A portion of this would be diverted through natural channels such as  
3 Georgiana Slough. An initial cut will be constructed to convey 4,500  
4 cfs. The means of diverting the water required in an excess of that  
5 which can be conveyed by this cut and existing channels, will be determined  
6 on the basis of information collected during the .first years of  
7 operation of the presently planned Delta Cross Channel, and will be  
8 presented at a later date. This additional information may indicate  
9 a total diversion requirement slightly exceeding the presently planned  
10 9,500 c.f.s. The presently planned diversion into the Delta Cross  
11 Channel will be by means of gravity without a diversion dam although  
12 pumps may be installed at a future date if operating experience shows  
13 the need for them to facilitate the diversion and achieve project  
14 objectives.

15 The California Data Exchange Center has sensor data for flows in the Delta Cross Channel.  
16 I downloaded graphs with tidal flows from 2012-2016; they are in exhibit DDJ-137.<sup>2</sup> The graphs  
17 showed peak tidal diversions of 13,600 cfs in September of 2016. The U.S. Geological Survey has  
18 tidally filtered flow. I downloaded graphs of tidally filtered flows, they are in exhibit DDJ-138.<sup>3</sup> The  
19 graphs show tidally filtered diversions from 2,500 to somewhat over 5,000 cfs. It seems clear from the  
20 graphs that the original application included peak tidal diversions in the Delta Cross Channel. I believe  
21 this is also referenced in Decision 990 (Exhibit DDJ-98), which states:

22 In fixing the rates of direct diversion to be allowed, the Board is inclined to greater liberality than  
23 usual because of the magnitude of the Project and the complexities involved in determining at  
24 this time the direct diversion as distinguished from rediversions of stored water. However,  
25 notwithstanding these considerations, we would require greater particularity in proof of direct  
26 diversion requirements were we not assured that no prejudice to others will result from failure of  
27 applicant to produce such proof. This assurance is provided by conditions which will be  
28 imposed in the permits subjecting exports of water from the Delta to use within the Sacramento  
River Basin and Delta so that there can be no interference with future development of these  
areas.

29 On cross-examination, Mr. Sahlberg stated that he did not know the current capacity of the  
30 Delta Cross Channel (Tr. Sept. 7, 2016.) This is important information for the Change Petition. The  
31 Delta Cross Channel capacity, together with the Delta Mendota Canal, totals over 14,100 cfs.

32 <sup>2</sup> Exhibit DDJ-137 is a true and correct copy of the graphs obtained from the CDEC website.

33 <sup>3</sup> Exhibit DDJ-138 is a true and correct copy of the graphs obtained from the USGS water data website.

1 According to permit 12721, the existing Delta facilities are over 78% of the total permitted rate of  
2 diversion of 18,000 cfs.

3 The remainder of the 18,000 cfs in the Bureau's original applications was for Sacramento  
4 Valley canals and M&I contracts for cities in the Sacramento Valley. The State Water Resources  
5 Control Board's records room has the Bureau's Progress Report submitted to the State Water Resources  
6 Control Board following D990. A copy of the 1970 progress report is provided as Exhibit DDJ-165.<sup>4</sup>  
7 Exhibit DDJ-165 shows the Sacramento Valley canals were the only diversion works that the Bureau  
8 listed as not being completed. The proposed new diversions are in the Sacramento Delta, not the  
9 Sacramento Valley, and are tunnels, and not a canal.

10 With the new 9,000 cfs conduits, the total capacity of the diversion works will be  
11 significantly higher than the Bureau's permits. The Board needs to examine whether the three new  
12 diversions for export should be in a new application by the Bureau, because they were not in the original  
13 permit application, and were not listed in the "work left to be completed." In addition, the new  
14 diversion works increase the total capacity well beyond the current permitted maximum.

#### 15 16 JOINT POINT OF DIVERSION (JPOD)

17 The Board did give the Bureau a permit for unlimited rates of diversion from Old River in  
18 Decision 1641 (Exhibit SWRCB-21) and added Clifton Court Forebay as another point of diversion.  
19 The only limit on the rate of diversion from Old River to Clifton Court Forebay under the JPOD is the  
20 Army Corps Engineers limit on 3 day average diversions and the physical capacity of the pumping  
21 plants. But the JPOD only applies to diversions from Old River, which is in the San Joaquin River  
22 watershed.

#### 23 24 AMOUNTS OF WATER

25 The Change Petition does not clearly provide the current and proposed amounts of water  
26 diverted under the Bureau's permits, although this information is required under Title 23 CCR 794.

27  
28 

---

<sup>4</sup> Exhibit DDJ-165 is a true and correct copy of the record on file with the State Water Resources Control Board.

1 Without this information, and information on the current and proposed rates of diversion, the Board  
2 cannot determine if there is an increase in either the total amount or total rate of direct diversion.

3 The Change Petition and Petitioners' Case in Chief also does not provide information on  
4 current and proposed maximum or average amounts of stored water that will be rediverted. This  
5 information is required under permit Term 14 of 12721, 12722, and 12723.

### 7 STORED WATER

8 The Change Petition does not provide information on current and proposed releases from  
9 storage, which is required under Title 23 Cal. Code Regs. § 794. Petitioners' and protestants' witnesses  
10 have testified that Petitioners' CALSIM II model does not represent actual reservoir operations under  
11 low storage conditions. There are also issues that the reservoir operations for the CALSIM II model  
12 were never adequately validated. Exhibit DDJ-121 is an excerpt from page 31 from Exhibit DDJ-101,  
13 the report of the 2003 CALSIM II Strategic Review by Close et. al. The highlighted portions show the  
14 reasons that the validation run for the CALSIM II model, submitted as exhibit DWR-505, needs to be  
15 redone. Exhibit DDJ-12 is an excerpt from page 18-19 from Exhibit DDJ-102, the 2004 response by  
16 the Petitioners to the 2003 CALSIM II Strategic Review. The highlighted portions show the  
17 commitment by the Department of Water Resources and the Bureau of Reclamation to validate the  
18 CALSIM II modeling of system operations. On cross-examination, Erik Reyes stated that he believed  
19 that the 2015 Delivery Reliability Report validated the model, but indicated that he had not looked at  
20 reservoir levels, including dead pool. This indicates no actual validation of CALSIM's modeling of  
21 reservoir operations and storage releases.

22 In addition, Decision 1275 (Exhibit DDJ-95)<sup>5</sup>, which granted DWR's permits for diversion,  
23 assumed augmentation of Sacramento River flows by one million acre-feet. Clearly the water supply  
24 for the proposed diversions has changed since the permit for a maximum of 10,300 cfs was issued.

---

28 <sup>5</sup> Exhibit DDJ-95 is a true and correct copy of Decision 1275, obtained from the State Water Resources Control Board website.

Executed on this 23<sup>rd</sup> day of March, 2017 in Santa Cruz, California.

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28



\_\_\_\_\_

Deirdre Des Jardins